



POSTER PRESENTATION

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# Deficiency of regulatory B cells in a house dust mite model of asthma

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## Introduction

Asthma is a chronic disorder leading to bronchial obstruction in response to inhaled allergen. It is associated with immune deregulation with specific expansion of Th<sub>2</sub> and Th<sub>17</sub> CD4<sup>+</sup> T cells. Both T cell populations support B cells response by stimulating their proliferation, survival and IgE secretion. B cells are described for their effector functions but recently reports have described their regulatory role in autoimmune and inflammatory disorders. However, definitive identification has been challenging because regulatory B cells (Breg) are rare, do not have a specific marker, and express detectable IL-10 or TGF-β only upon *ex vivo* stimulation. In OVA asthma models, local inhalation tolerance [1], [2] and infections with helminthes [3], [4] induce the generation of regulatory B cells. But no physiological role of this population in the development of asthma has been described yet.

## Methods

Mice were sensitized on days 0, 7, 14 and 21 by percutaneous administration of HDM onto the ears. Intra-nasal challenges were performed on day 27 and 34 with 250 μg HDM. One day after each challenge, we realized by flow cytometry a complete B cell phenotyping in spleen and lungs.

Splenocytes and lung cells were isolated and stimulated *ex vivo* with LPS and PMA, ionomycin to induce IL-10 secretion by B cells.

## Results

No differential frequency was observed for all B cell populations in the spleen of HDM allergic mice, suggesting a normal B cell development. In contrast, HDM allergic

mice exhibit a strong infiltration of CD19<sup>+</sup> B cells in lungs and broncho-alveolar lavage after the second challenge. We found an increase of CD19 IgD<sup>hi</sup> IgM<sup>low</sup> B2 mature and CD19 IgD- IgM- switched memory B cells in the lung of HDM allergic compared to control mice. We looked at CD19<sup>+</sup> IL-10<sup>+</sup> CD1d<sup>hi</sup> CD5<sup>+</sup> CD21<sup>+</sup> CD24<sup>hi</sup> IgM<sup>hi</sup> B cell population that has been shown to display regulatory properties in other situations. Whereas this population is present in spleen and lungs of HDM allergic mice, it produces less IL-10 than control after the first and the second challenge both in lung (vs control, p<0.01) and spleen (vs control, p<0.05).

## Conclusions

Our results strongly suggest a potential defect of regulatory B cells in the course of asthma. Future investigations will focus on their capacities to inhibit bronchial hyperreactivity and inflammatory responses.

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## References

1. Singh A, Carson WF, Secor ER, Guernsey LA, Flavell RA, Clark RB, Thrall RS, Schramm CM: **Regulatory role of B cells in a murine model of allergic airway disease.** *J. Immunol* 2008, **180**(no. 11):7318-7326.
2. Natarajan P, Singh A, McNamara JT, Secor ER, Guernsey LA, Thrall RS, Schramm CM: **Regulatory B cells from hilar lymph nodes of tolerant mice in a murine model of allergic airway disease are CD5(+), express TGF-β, and co-localize with CD4(+)/Foxp3(+) T cells.** *T cells* 2012, 1-11.
3. A S, S SP, K M, M NE, A A, F PG: **Regulatory B cells prevent and reverse allergic airway inflammation via FoxP3-positive T regulatory cells in a murine model.** *Journal of Allergy and Clinical Immunology* 2010, **125**(no. 5):1114-1124.e8.
4. van der Vlugt LEPM, Labuda LA, Ozir-Fazalikhhan A, Lievers E, Gloude-mans AK, Liu K-Y, Barr TA, Sparwasser T, Boon L, Ngoa UA,

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Feugap EN, Adegnikaa AA, Kreamsner PG, Gray D, Yazdanbakhsh M, Smits HH:  
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B cells: inhibition of allergic inflammation by IL-10 and regulatory  
T cells. *PLoS ONE* 2012, no. 7(2):e30883.

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